



PCT/GB2004/004234



INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

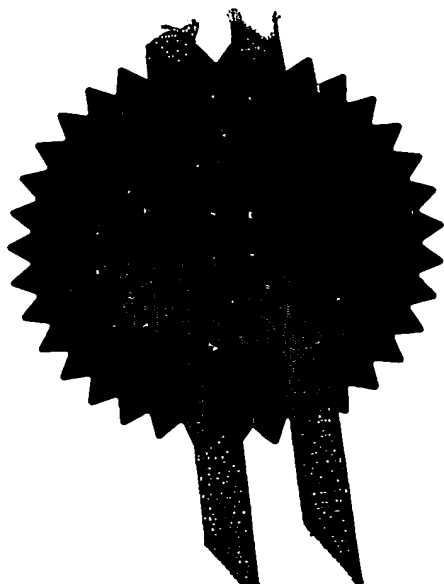
REC'D 03 NOV 2004	
WIPO	PCT

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed

Dated 20 October 2004

**PRIORITY
DOCUMENT**
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

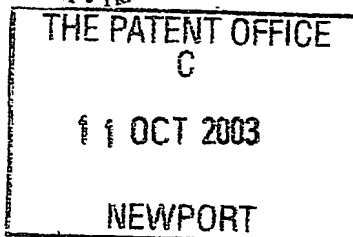


130CT03 E843912-4 D01559
P01/7700 0000-0323871.4

1/77

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference

RRH/VH/PJ20

2. Patent application number

(The Patent Office will fill this part in)

0323871.4

11 OCT 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Cintec International Limited
Cintec House
11 Gold Tops
Newport
South Wales
NP20 4PH

79.29987002

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

Improvements in and relating to Blast Mitigation Structures

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Wynne-Jones, Laine & James
Morgan Arcade Chambers
33 St. Mary's Street
Cardiff
CF10 1AF
Wales

Patents ADP number (if you know it)

00001792001

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note f)

Number of earlier UK application

Date of filing
(day / month / year)

8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

Answer YES if:

Yes

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

Patents Form 1/77

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form

Description	7
Claim(s)	0
Abstract	0
Drawing(s)	5

Handwritten signature/initials

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for a preliminary examination and search (Patents Form 9/77)

Request for a substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. ~~I~~We request the grant of a patent on the basis of this application.

Signature(s) Wynne-Jones, Laine & James

Wynne-Jones, Laine & James

Date 10.10.2003

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

Richard Halstead - 01242 515807

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered YES in part 8, a Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- Part 7 should only be completed when a divisional application is being made under section 15(4), or when an application is being made under section 8(3), 12(6) or 37(4) following an entitlement dispute. By completing part 7 you are requesting that this application takes the same filing date as an earlier UK application. If you want the new application to have the same priority date(s) as the earlier UK application, you should also complete part 6 with the priority details.

Improvements in and relating to Blast Mitigation Structures

This invention relates to blast mitigation structures which use liquid-filled containers such as water-filled flexible bags, arranged so as to mitigate the effects of a blast or explosion by dissipating and/or converting to heat the resulting blast energy.

Blast mitigation structures using water-based technology are well known and for instance US patent no. 4836079, the disclosure of which is incorporated herein by reference, teaches various embodiments of bomb blast inhibitors which can be inflated with air, placed around e.g. a bomb, and then filled with water, the water then acting to suppress or otherwise mitigate against the effects of any ensuing explosion. This concept has been taken at least a further step by the use of, effectively, twin-walled containers as taught in GB2374625A, the disclosure of which is also incorporated herein by reference, which include internal connectors between opposing walls and surfaces, such as through the use of drop stitch material, by which the container is prevented from bulging outwardly, the main benefit being that a protective wall can then be erected which is taller than the width of the base without the container collapsing or toppling over under the weight of water.

A problem with such prior art devices is that although they are very efficient in safely dealing with the effects of explosions, given that the containers themselves are not made of rigid material and hence when fragmented by an explosion such fragments do not constitute flying debris equivalent to shrapnel, it will be apparent that the inflation of such structures by air followed by substitution of air under pressure for water under pressure by e.g. the use of a

suitable pressure relief valve arrangement, still necessarily takes some time to complete the structure. In the event of e.g. a car bomb having to be dealt with it will be understood that this may jeopardise the safety of personnel erecting such blast mitigation structures around the car.

5 The present invention is derived from the realisation that, especially when dealing with potential car bombs i.e. suspect vehicles, speed is of the essence in quickly and safely erecting a blast protection structure around the vehicle using rupturable liquid-filled containers such as water-filled bags, but in conjunction with means for rapidly deploying the containers therearound.

10 According to the invention, there is provided a blast mitigation structure comprising one or more rigid free-standing frames of one or more channel section, the or each frame being adapted to receive in the or each channel, in use, one or more rupturable containers adapted to contain liquid, such as water, to thereby form a protective tunnel around e.g. a vehicle for mitigating against
15 the effects of an explosion.

Conveniently, the or each rigid frame is in the form of an arch made of some suitably rigid but lightweight material such as e.g. aluminium or reinforced plastics such that even though, following detonation of e.g. a car bomb, such material then disintegrates into flying debris or shrapnel the relatively low mass
20 of each piece thereof provides a correspondingly lower risk of injury or damage, as the case may be.

The or each rigid frame may suitably include apertures therein, such as by being in the form of a grill, the exposed parts of the or each rupturable container thereby being in the direct path of the explosion such that rupturing of

the exposed surface area of the or each container occurs simultaneously with damage caused to the or each rigid frame by the explosion.

Conveniently, opposing sidewalls of the or each channel section of the or each rigid frame extend only partially around opposing side walls of the or each rupturable container such that where two or more of such frames and corresponding containers are placed side-by-side they touch beyond this region. Hence, as they rupture during an explosion the containers prevent or inhibit the sidewalls of the channels from flying off following an explosion without at least being partially restrained by the presence of the water and/or the flexible material from which the rupturable containers are made.

Conveniently, the blast-suppressing structure is transportable and may even take the form of a wheeled vehicle which may be moved, such as by being towed or pushed by a powered vehicle over and around a suspect device or vehicle, as the case may be. Alternatively, where the structure is intended to be formed by a series of rigid frames placed adjacent each other to form an arched tunnel each such arch and associated rupturable container or containers may be placed on individual trolleys connectable with others, such as those used to transport luggage around airports.

As will be apparent, an arched tunnel structure necessarily implies open ends and, accordingly, the invention also envisages the use of free-standing water-filled rupturable containers being positioned at each open end so as to provide an entirely closed structure when the assembly is complete.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of part of a blast mitigation structure in accordance with the invention,

Figure 2 is an end view of the structure of Figure 1 showing a vehicle therein,

5 Figure 3 is a schematic sectioned view of part of the structure of Figures 1 and 2,

Figure 4 is a schematic sectioned view of an alternative embodiment to that shown in Figure 3,

10 Figure 5 is a schematic sectioned view of a further alternative embodiment to that shown in Figures 3 and 4,

Figure 6 is a side elevation of part of a blast mitigation structure in accordance with a further embodiment of the invention,

Figure 7 is an end elevation of part of a blast mitigation structure in accordance with a still further embodiment of the invention,

15 Figure 8 is a schematic side view of individual elements making up a blast protection structure in accordance with the invention being transported,

Figure 9 is a side elevation of a fully constructed blast mitigation structure in accordance with one embodiment of the invention, and

20 Figure 10 shows an alternative embodiment of a blast mitigation structure to that shown in Figure 9.

Referring firstly to Figures 1 and 2 an arched structure shown generally at 1 is composed of individual segments of free standing arched rigid frame sections 2 having channels into each of which are placed individual inflatable

bags 3 shaped to fit therein such that, as will be apparent, initially these bags are generally rectilinear but become arched towards the top of the structure 1.

In Figures 3, 4 and 5 are schematically shown various alternative embodiments of structures having profile frame section for making up the arched structure 1. In Figure 3, the profile of the rigid sections 2a is such that they are connected together to form a length of connected channels in which side walls 4 are shared by adjacent inflatable bags 3. In addition, apertures 5 are provided in the bottom of each channel section 2a such as being in the form of a grill so that, following an explosion, the side walls of the bags 3 in this region are exposed thereto and, as a consequence, water contained in the bags 3 is then able to mitigate against the effects of the explosion even while the rigid frame caused by the presence of the channel section 2a remains intact momentarily.

In Figure 4 an alternative profile is proposed in which each rigid frame section 2b is shown capable of accommodating, in this embodiment, a total of three lines of bags 3 which are retained in their respective positions by virtue of return lips 6 which help retain the outer most bags 3 in position. Each rigid frame section 2b is capable of being butted up against an adjacent frame section 2b as shown in the drawing and hence whilst still being transportable can be used to quickly form the structure shown in Figures 1 to 2.

In Figure 5 there is an alternative embodiment in which instead of individual rigid frame sections 2b as shown in Figure 4, each able to accommodate three lines of the bags 3, the rigid frame sections 2c shown may be of any desired length, having individual channel sections to accommodate any desired number of bags 3.

In Figure 6 there is shown a side view a completed arched tunnel with an alternative arrangement in which the side walls 4a of each frame section 2d do not support the entire side walls of the bags 3 but instead allow the bags to "close in" around the walls 4, such that no rigid elements are visible outwardly other than at the ends of the respective tunnel. In this embodiment, it is envisaged that, following an explosion, flying debris from the rigid structure made up by the individual channel elements 2d has to pass through the wall of bags 3 in the region where they overlap such that there is at least some suppression of some or all of the resultant flying debris.

In Figure 7 there is shown an end elevation of a further alternative embodiment of the invention which envisages the use of hoses strategically placed around the inside walls of the rigid frame sections 2, 2a, 2b, 2c, and 2d which may be interconnected or interconnectable with each other and with the bags 3 such that upon the structure 1 being assembled the bags may thereafter be quickly filled with water to complete this part of the assembly of the entire blast mitigation structure.

In Figure 8 is shown schematically an arrangement by which individual rigid frame sections 2 with attendant bags 3 may be transported on e.g. luggage trolleys as conventionally used at airports. Larger bags 8 may be individually transported and may be used for particular applications, such as blocking holes or in combination with other such bags surrounding small bombs.

In Figures 9 and 10 are shown two alternative but complete blast mitigation structures of the type shown with reference to e.g. Figure 1 but in which the ends have been blocked by means of self-supporting inflatable bags.

7.

These are initially filled with air in order to attain their required shape and then through the use of pressure relief valves the air is replaced with water under pressure to thereafter maintain the desired shape. In Figure 9, the bags 3a are pneumatically interconnected and include internal reinforcements, such as by being made of drop stitch material, to maintain the desired shape, in this example a stepped structure of shape sufficient to close the arched structure 1.

In Figure 10 a different configuration is adopted where the bags 3b collectively define when inflated a right angled triangle in section, where bag forming the hypotenuse is used as reinforcement to ensure that the structure does not collapse.

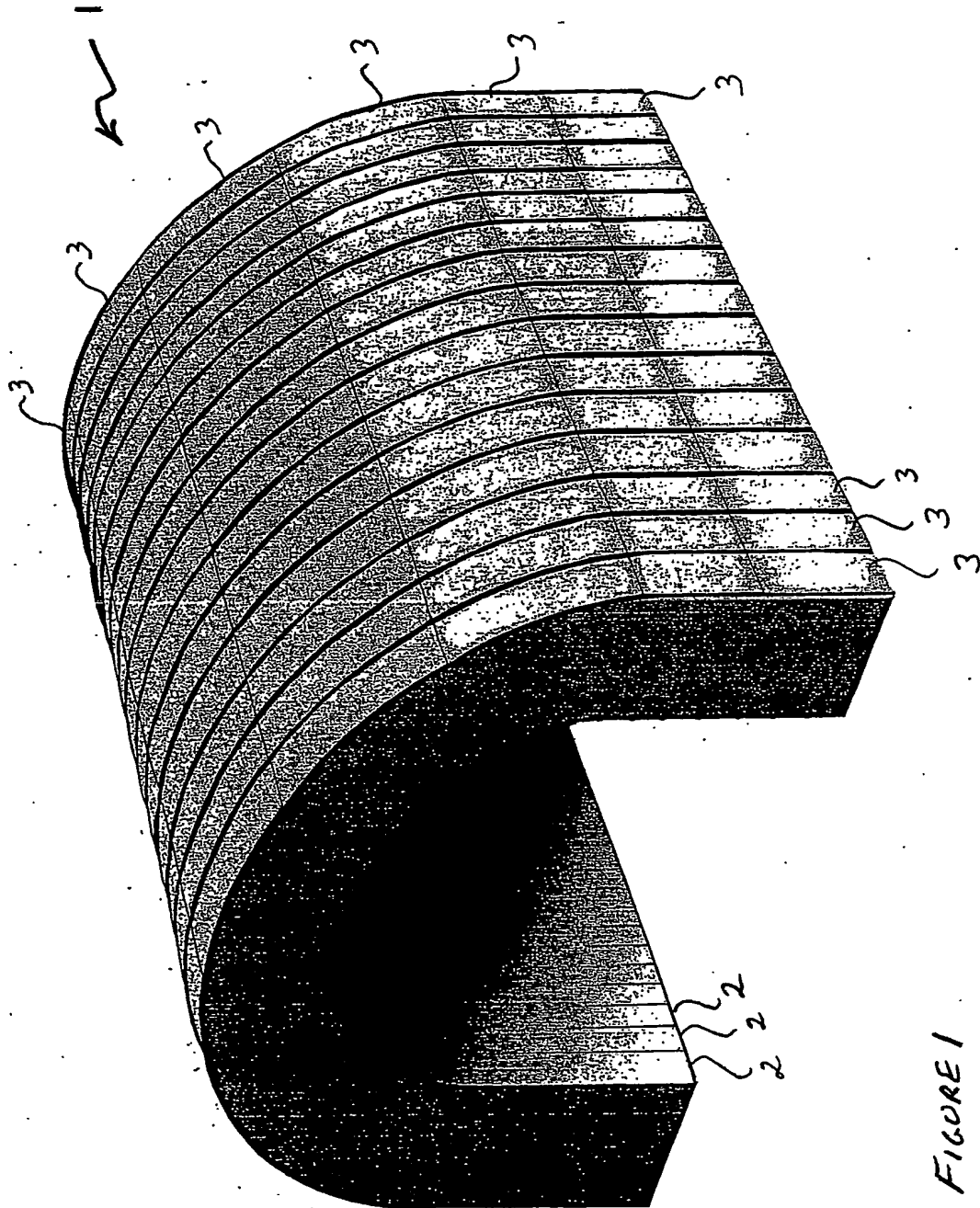


FIGURE 1

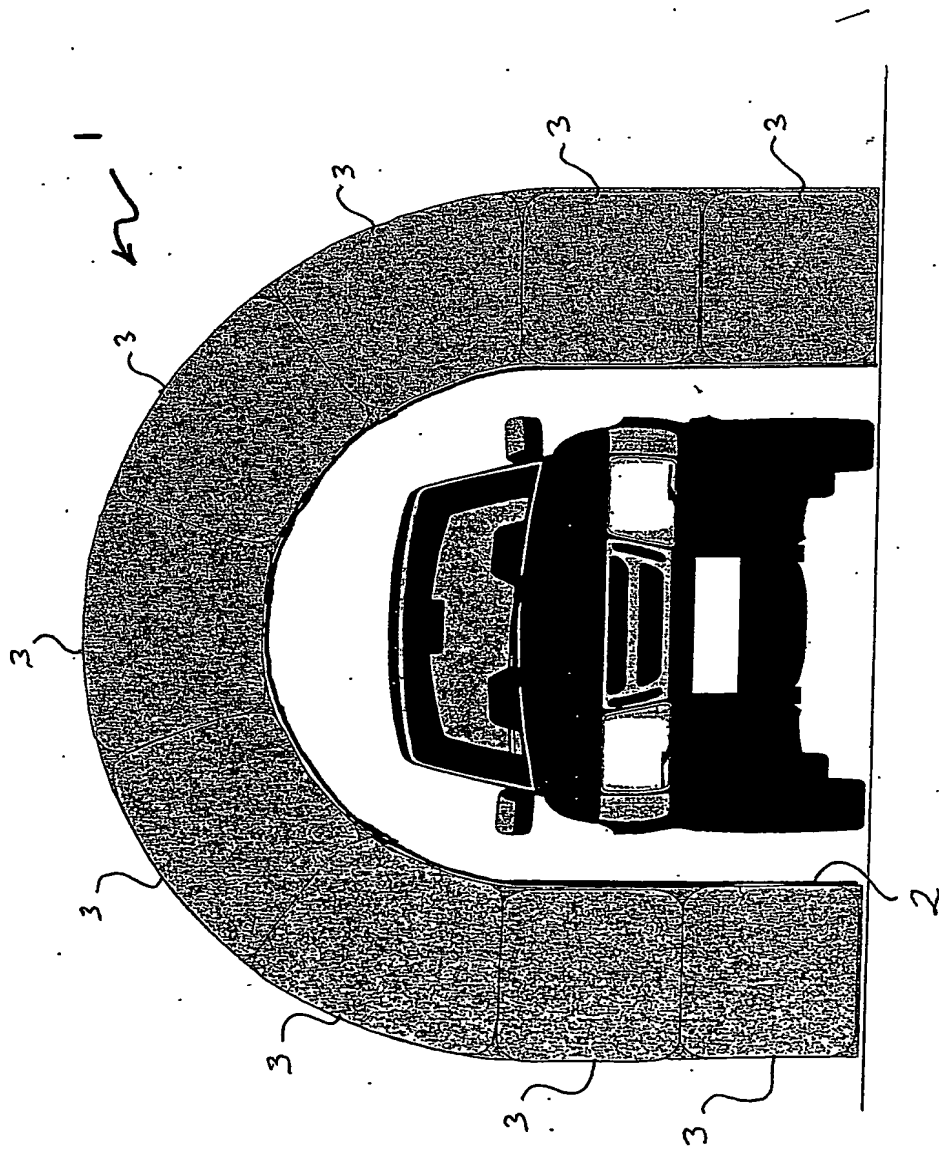


FIGURE 2

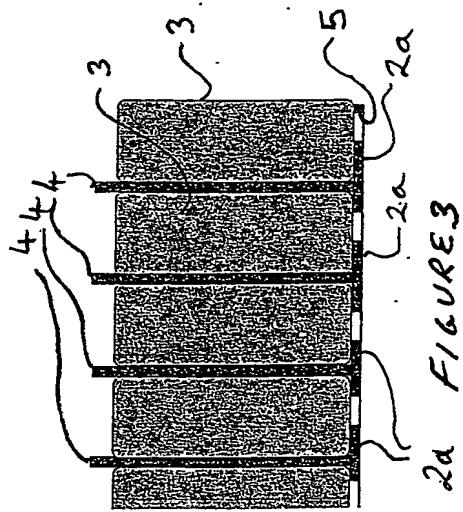


FIGURE 3

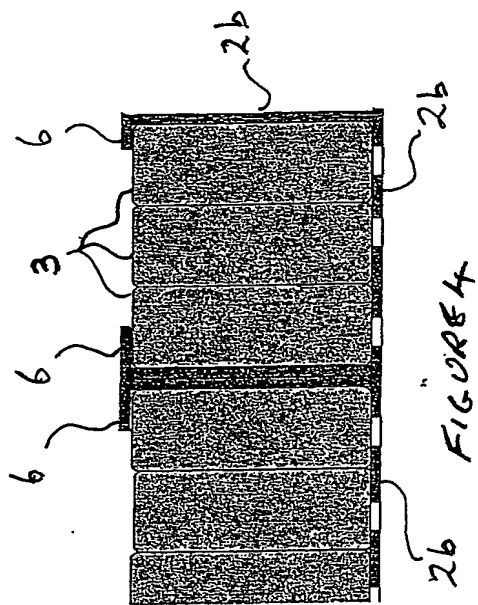


FIGURE 4

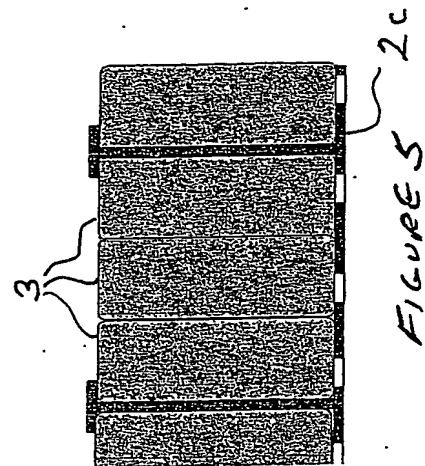


FIGURE 5

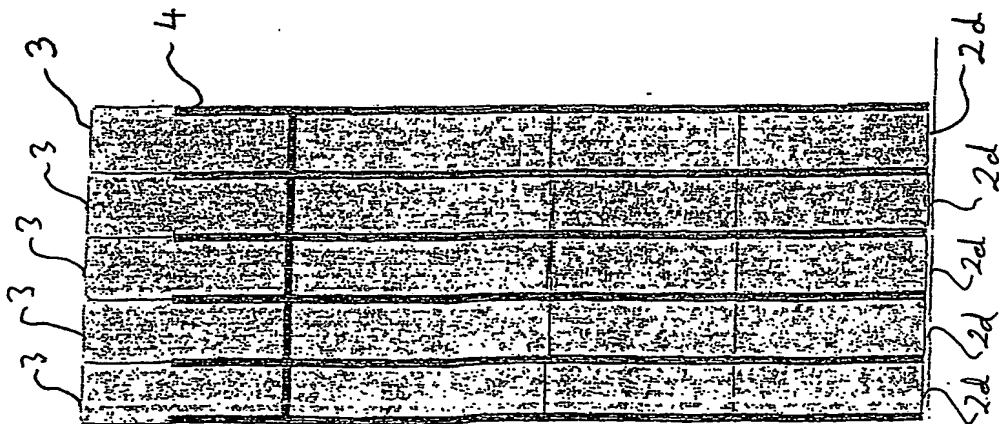


FIGURE 6

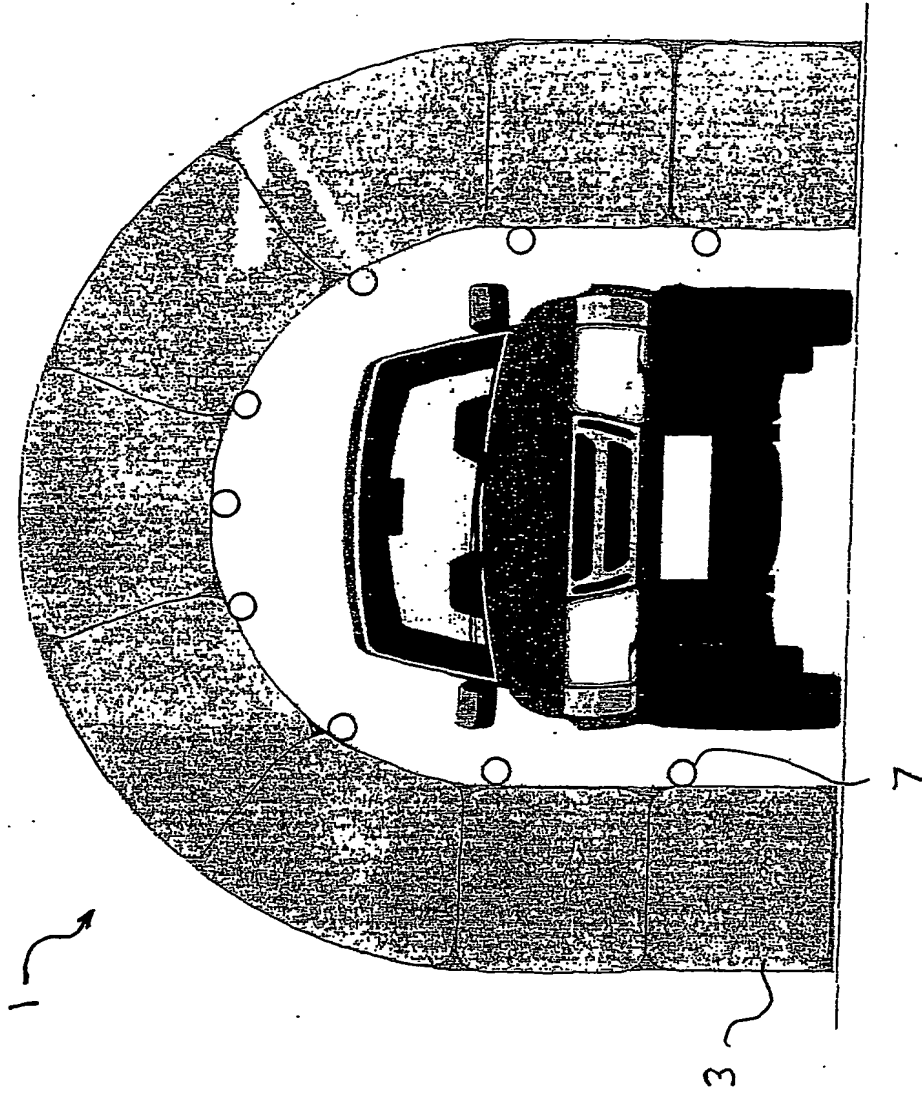


FIGURE 7

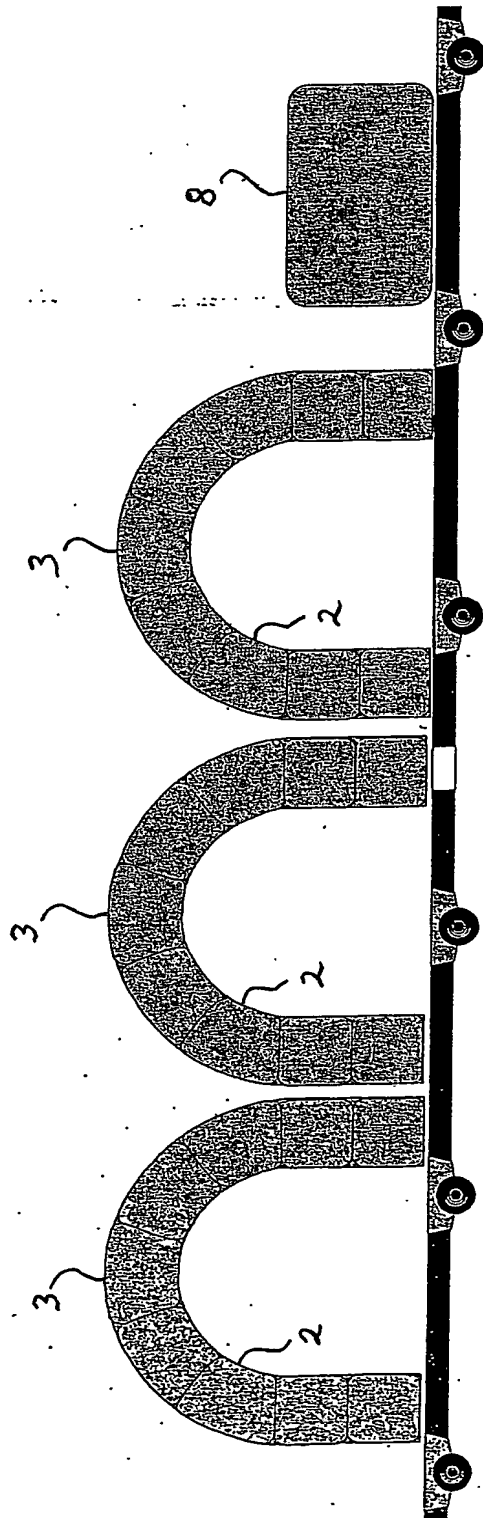


FIGURE 8

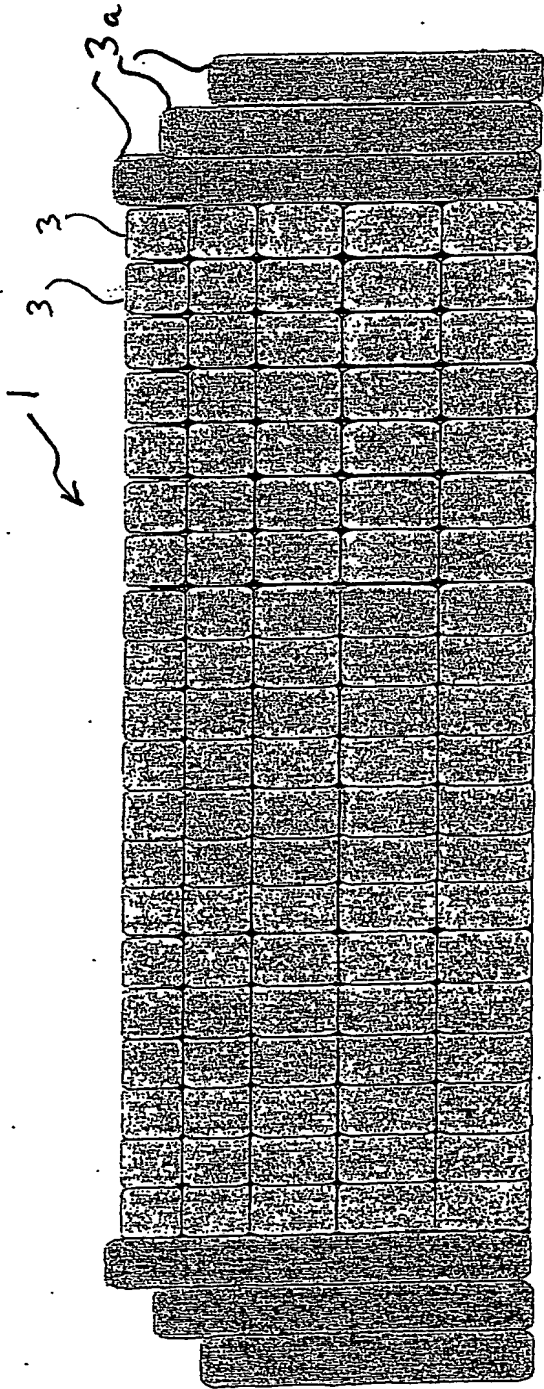


FIGURE 9

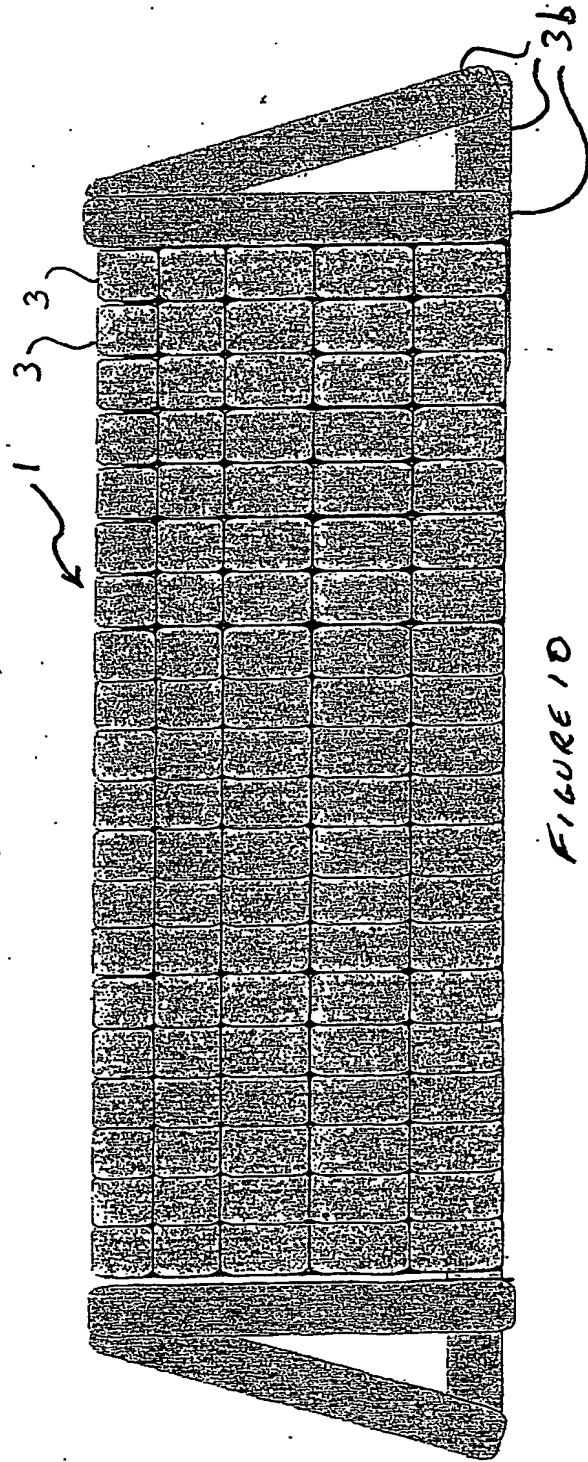


FIGURE 10

PCT/GB2004/004234



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

☐ BLACK BORDERS

☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES

☒ FADED TEXT OR DRAWING

☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING

☐ SKEWED/SLANTED IMAGES

☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS

☐ GRAY SCALE DOCUMENTS

☒ LINES OR MARKS ON ORIGINAL DOCUMENT

☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY

☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.